

**REMARKS**

Claims 1-4, 6-8, 10-22 and 24-28 are pending in this application. Non-elected claims 11-19 have been withdrawn from consideration by the Examiner. Reconsideration and allowance of the application based upon the following remarks are respectfully requested.

**I. Rejections Under 35 U.S.C. § 103**

A. Janjic, Brodtkin, Sozio, and Toussaint

Claims 1, 3, 4, 6, 20-22, 25 and 26 are rejected under 35 U.S.C. §103(a) over U.S. Patent No. 3,934,348 to Janjic ("Janjic") in view of U.S. Patent No. 6,428,614 to Brodtkin et al. ("Brodtkin") and U.S. Patent No. 4,585,417 to Sozio et al. ("Sozio"), and further in view of U.S. Patent No. 3,619,240 to Toussaint et al. ("Toussaint"). Applicants respectfully traverse the rejection.

Claim 1 recites, *inter alia*, that "the second porcelain is constituted principally by ceramic whose composition is different from that of the ceramic of the first porcelain such that viscosity of the second porcelain at the casting temperature is lower than that of the first porcelain." Emphasis added. The applied references fail to teach, suggest, or establish any reason or rationale to provide at least this feature.

As acknowledged by the Office Action, Janjic does not teach that the second porcelain is constituted by ceramic whose composition is different from that of the ceramic material of the first porcelain, such that viscosity of the second porcelain at the casting temperature is lower than that of the first porcelain. See Office Action, page 4, item b.

Likewise, as acknowledged by the Office Action, Brodtkin is silent as to the viscosity differential between the regular and the porcelains. See Office Action, pages 4 and 5, item c. However, the Office Action alleges that Brodtkin's Table 3 teaches the compositions of the regular porcelain and the opaque porcelain, and these "compositions fit the claimed range for the porcelain layers." *Id.* However, Brodtkin provides no information regarding the viscosity

of either of the porcelains, much less disclose or suggest that the viscosity of the regular porcelain is lower than that of the opaque porcelain.

To the extent that the Office Action asserts this feature is present in Brodtkin based on inherency, such basis is not properly established and the assertion is thus improper. Specifically, it is improper for the Office Action to rely on inherency to establish that Brodtkin discloses that viscosity of the regular porcelain is lower than that of the opaque porcelain, because the compositions discussed in Brodtkin do not necessarily satisfy such properties, which is required to support a rejection based on inherency.

As is well settled:

To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. **Inherency, however, may not be established by probabilities or possibilities.** The mere fact that a certain thing may result from a given set of circumstances is not sufficient.'

*In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999) (citations omitted). Furthermore, MPEP §2112(IV) states "[i]n relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art.' *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990)."

Here, Brodtkin's Table 3 does not even disclose any composition that is identical to the claimed contents of the first porcelain and the second porcelain. For example, claim 1 requires that the second porcelain has, as a main component, a glass composition that is essentially constituted by 0.1-5 mass % of MgO, but in Brodtkin's Table 3, MgO is non-essential components of the body and incisal porcelain. Because the Brodtkin fails to disclose the first porcelain and the second porcelain having the identical composition as recited in claim 1, there is no basis to reasonably support that Brodtkin's composition has the claimed

properties. Therefore, Brodtkin does not cure the deficiencies of Janjic with respect to claim 1.

Claim 1 also recites that "a step of forming a cast coating layer on at least a part of a surface of the back coating layer, by pouring a second porcelain which is held by ceramic holding portion provided with the casing mold, and is softened by heating with the casting mold, into the void of the casting mold via the porcelain introducing passage under pressure using the casing mold heated to a casting temperature to form at least two coating layers including the back coating layer and the cast coating layer on the surface of the substrate." Emphasis added. The applied references also fail to teach, suggest, or establish any reason or rationale to provide at least this feature.

Specifically, when a softened second porcelain is poured into a void of a casting mold via a porcelain introducing passage to form a cast coating layer on at least a part of a surface of the back coating layer, the second porcelain is introduced into the void under pressure using a plunger or the like. See specification, paragraph [0087]. Such actions may be referred to as dynamic casting.

In this regard, although the Office Action acknowledges that "the combination of Janjic and Brodtkin do not teach how the regular porcelain layer (second porcelain) is added to the first layer," the Office Action alleges that "Sozio teaches a modified mold which has ceramic holding portion (part 44 of Fig. 4) which can hold ceramic material (ingot or disc) which is heated and injected (under pressure using a plunger) into the cavity of a mold through a porcelain introducing passage (part 48 of Fig. 4)." See Office Action, pages 6 and 7, items e and f. Applicants respectfully disagree.

Sozio merely discloses in Fig. 2 the opening 28 formed in the mold block 20, and discloses in Fig. 4 the opening 44 formed in the mold block 40. Thus, Sozio merely discloses static casting. Nowhere in the entire disclosure of Sozio is there any indication that a ceramic

material is supplied "into the void of the casting mold via the porcelain introducing passage under pressure," as recited in claim 1. Therefore, Sozio does not cure the deficiencies of Janjic and Brodtkin with respect to claim 1.

Additionally, one of ordinary skill in the art would have had no reason to combine Toussaint with the other applied references. The claimed invention is very different from Toussaint in its technical field, the problem to be solved, and the features, a person of ordinary skill in the art would not have combined the teachings of Toussaint with Janjic, Brodtkin, and Sozio, and somehow modified their combined teachings to arrive at the claimed method with any reasonable expectation of success.

Firstly, claim 1 recites "a method of manufacturing a dental prosthesis," whereas Toussaint relates to a process of treating an article, and this treating process is used to treat a tumbler (see Toussaint, col. 3, line 23) or a tableware (see Toussaint, col. 5, line 51). Thus, the claimed invention and Toussaint are very different from each other in their technical fields.

Secondly, in the claimed invention, when a cast coating layer is formed on a surface of a back coating layer formed on a substrate by a casting process, the back coating layer could be partially moved by flow of a casting porcelain (which forms the cast coating layer), if the casting porcelain is cast at a high temperature. Consequently, the back coating layer could have variation in its thickness. See specification, paragraph [0009]. Thus, the claimed invention can prevent the partial movement of the back coating layer when the cast coating layer is formed on the surface of the back coating layer formed on the substrate by the casting process. The partial movement of the back coating layer causes the formed position and thickness value of the cast coating layer (formed to express the desired color tone and transparency) to be different from those as designed. See specification, paragraphs [0010] and [0012].

In contrast, a thermal tempering of Toussaint involves heating of a glass to temperature close to its softening point and then rapidly chilling the glass in a current of air to increase a mechanical strength. The known thermal tempering processes has one limitation that it can only be carried out in an effective manner on a sheet glass having a minimum thickness of about 3 mm. Also, the known thermal tempering process has other drawback, which relates to the requirements imposed on the tempering apparatus by the high temperatures which must be maintained and to various types of defects which can be produced in the glass as a result of having been exposed to the high temperatures of the thermal tempering process. See Toussaint, col. 1, lines 23-28. Thus, one of the objects of Toussaint is to increase the tensile strength of the articles without heating them to high temperatures. See Toussaint, col. 1, lines 39-41. Thus, the claimed invention and Toussaint are very different from each other in their problems to be solved.

Thirdly, Toussaint merely discloses a process of treating the article that comprises a step of applying a glass coating on the based layer, a step of heating the coating, and a step of cooling the coating and the base layer. See Toussaint, claim 1. In the heating step, the coating is of a material, which softens at a lower temperature, and has a lower coefficient of thermal expansion, than the material of the base layer. In the cooling step, the coating is solidified for placing it in a state of compression as a result of the differential thermal contraction of the coating and base layer. See Toussaint, claim 1. Thus, the claimed invention and Toussaint are very different in their features.

Accordingly, in view of the vast differences in the technical field, the problem to be solved, and the features of the claimed invention when compared to Toussaint, one skilled in the art would not have neither looked to Toussaint for guidance regarding the claimed subject matter, nor had proper guidance from the teachings of Toussaint in combination with the

other applied references to arrive at the claimed combination of features recited in claim 1 with a reasonable expectation of success.

Clearly, the combination of the applied references is based upon impermissible hindsight because the Office Action combines the applied references solely based on Applicants' claims as a roadmap, which is clearly improper. Therefore, the combination of Toussaint with the other applied references is improper and, as a result, claim 1 and its dependent claims would not have been rendered obvious by the applied references at least because the combination of applied references is improper.

Even if the references were combined, Toussaint does not cure the deficiencies of Janjic, Brodtkin and Sozio with respect to claim 1. Toussaint merely discloses that, when the base layer and the coating are joined, viscosity of the coating is lower than that of the base layer so that the coating softens at temperature lower than that for the base layer. See Toussaint, col. 3, lines 40-50. However, Toussaint merely teaches the relation of viscosities between the base layer and the coating at the joining temperature, and is silent as to the temperature other than the joining temperature. Thus, Toussaint fails to teach "the second porcelain is constituted principally by ceramic whose composition is different from that of the ceramic of the first porcelain such that viscosity of the second porcelain at the casting temperature is lower than that of the first porcelain," as recited in claim 1. That is, Toussaint fails to teach that, when the casting mold reaches the casting temperature, viscosity of the second porcelain becomes lower than that of the first porcelain. As explained in the Declaration submitted on May 15, 2010, viscosities of the first porcelain and the second porcelain change depending on temperature. Without such a disclosure, there would have been no reason or rationale for a person of ordinary skill in the art to arrive at the claimed features with any reasonable expectation of success.

Additionally, patentability of the current claims is also supported by unexpected results. For example, the claimed method provides unexpected results in that the base coating layer formed with the first porcelain and the cast coating layer formed with the second porcelain are adhered firmly to each other. Even if the applied references are combined, advantageous effects of the claimed method cannot be achieved.

Thus, for at least the reasons presented above, claim 1 and its dependent claims would not have been rendered obvious by the applied references.

Moreover, none of the applied references, even combined, provide the motivation to adjust the ratio of  $\text{SiO}_2$  (mass %) to  $\text{Al}_2\text{O}_3$  (mass %) or the ratio of  $\text{SiO}_2$  (mass %) to  $\text{Na}_2\text{O}$  (mass %), as recited in claims 25 and 26. Thus, for this additional reason, at least claims 25 and 26 would not have been rendered obvious by the applied references.

Reconsideration and withdrawal of the rejection are respectfully requested.

B. Janjic, Brodtkin, Sozio, Toussaint, and Fukuda

Claims 2 and 24 are rejected under 35 U.S.C. §103(a) over Janjic in view of Brodtkin, Sozio, and Toussaint, and further in view of Japanese Patent Publication No. 06-269466 to Fukuda et al. ("Fukuda"). Applicants respectfully traverse the rejection.

Fukuda is applied only for its alleged teachings of dependent claims 2 and 24, and thus fails to cure the deficiencies of Janjic, Brodtkin, Sozio and Toussaint (see Section (I) (A) above) with respect to claim 1, from which claims 2 and 24 depend. Thus, claims 2 and 24 would not have been rendered obvious by the applied references.

Reconsideration and withdrawal of the rejection are respectfully requested.

C. Brodtkin and Toussaint

Claims 7, 8, 10, 27 and 28 are rejected under 35 U.S.C. §103(a) over Brodtkin in view of Toussaint. Applicants respectfully traverse the rejection.

As discussed above, in view of the vast differences in the technical field, the problem to be solved, and the features of the claimed invention when compared to Toussaint, one skilled in the art would not have neither looked to Toussaint for guidance regarding the claimed subject matter, nor had proper guidance from the teachings of Toussaint in combination with Brodtkin to arrive at the claimed combination of features recited in claim 7 with a reasonable expectation of success.

Clearly, the combination of the applied references is based upon impermissible hindsight because the Office Action combines the applied references solely based on Applicants' claims as a roadmap, which is clearly improper. Therefore, the combination of Toussaint with Brodtkin is improper and, as a result, claim 7 and its dependent claims would not have been rendered obvious by the applied references at least because the combination of applied references is improper.

Even if Toussaint is combined with Brodtkin, the applied references fail to teach or suggest the combination of features required by claim 7. For example, Brodtkin's Table 3 does not even disclose any composition that is identical to the claimed contents of the first porcelain and the second porcelain. Because the Brodtkin fails to disclose the first porcelain and the second porcelain having the identical composition as recited in claim 7, there is no basis to reasonably support that Brodtkin's composition has the claimed viscosity properties.

Toussaint does not cure the deficiencies of Brodtkin with respect to claim 7.

Thus, claim 7 and its dependent claims would not have been rendered obvious by the applied references.

Moreover, none of the applied references, even combined, provide the motivation to adjust the ratio of  $\text{SiO}_2$  (mass %) to  $\text{Al}_2\text{O}_3$  (mass %) or the ratio of  $\text{SiO}_2$  (mass %) to  $\text{Na}_2\text{O}$  (mass %), as recited in claims 27 and 28. Thus, for this additional reason, at least claims 27 and 28 would not have been rendered obvious by the applied references.



Reconsideration and withdrawal of the rejection are respectfully requested.

D. Janjic, Brodkin, and Toussaint

Claims 7, 8, 10, 27 and 28 are rejected under 35 U.S.C. §103(a) over Janjic in view of Brodkin and further in view of Toussaint. Applicants respectfully traverse the rejection.

As discussed above, in view of the vast differences in the technical field, the problem to be solved, and the features of the claimed invention when compared to Toussaint, one skilled in the art would not have neither looked to Toussaint for guidance regarding the claimed subject matter, nor had proper guidance from the teachings of Toussaint in combination with Janjic and Brodkin to arrive at the claimed combination of features recited in claim 7 with a reasonable expectation of success.

Clearly, the combination of the applied references is based upon impermissible hindsight because the Office Action combines the applied references solely based on Applicants' claims as a roadmap, which is clearly improper. Therefore, the combination of Toussaint with the other applied references is improper and, as a result, claim 7 and its dependent claims would not have been rendered obvious by the applied references at least because the combination of applied references is improper.

Even if Toussaint is combined with Janjic and Brodkin, the applied references fail to teach or suggest the combination of features required by claim 7. For example, Brodkin's Table 3 does not even disclose any composition that is identical to the claimed contents of the first porcelain and the second porcelain. Because the Brodkin fails to disclose the first porcelain and the second porcelain having the identical composition as recited in claim 7, there is no basis to reasonably support that Brodkin's composition has the claimed viscosity properties.

Toussaint does not cure the deficiencies of Janjic and Brodkin with respect to claim 7.

Thus, claim 7 and its dependent claims would not have been rendered obvious by the applied references.

Moreover, none of the applied references, even combined, provide the motivation to adjust the ratio of SiO<sub>2</sub> (mass %) to Al<sub>2</sub>O<sub>3</sub> (mass %) or the ratio of SiO<sub>2</sub> (mass %) to Na<sub>2</sub>O (mass %), as recited in claims 27 and 28. Thus, for this additional reason, at least claims 27 and 28 would not have been rendered obvious by the applied references.

Reconsideration and withdrawal of the rejection are respectfully requested.

## **II. Conclusion**

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of the application are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

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